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Proposed Cruise Plan of R/V TINRO for Pacific Salmon Marine Period of Life Research in the Bering Sea in June-October 2004

by

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BRIEF DESCRIPTION OF SURVEY

The results of the Russian survey at the summer-autumn period of 2002-2003, as a part of the international BASIS program in the western Bering Sea, have showed significant changes in the structure and composition of the upper pelagic ecosystems of this region as compared with 1980-90-ies period. These changes resulted in the significant decrease of overall biological production due to the lowered abundance of walleye pollock and some other species. As the result of these changes, the mesopelagic fish species (Myctophidae), which were previously consumed by walleye pollock, became dominant in the pelagic layer of the deep-water regions of the western Bering Sea, as well as Pacific salmon and juvenile Atka mackerel. The abundance of Pacific salmon (chum, sockeye and chinook) that are foraging in the Bering Sea has grown considerably since 1980-90-ies period. Despite of the increase of salmon abundance, the biomass of zooplankton (mostly crustaceans) in the western Bering Sea remains steadily high. The are no any notable changes in the salmon diet. At the same time, the information on the state of the eastern Bering Sea ecosystem (including plankton and nekton components of ecosystem) indicates that situation is unstable and there is a possibility of these signs of crisis to spread into the western Bering Sea. Further monitoring activities in the Bering Sea will enable to trace the dynamics of possible changes in ecosystems and to determine the contemporary status of the Pacific salmon in the Bering Sea. This dictates the necessity of further research and coordination of international efforts along the research of ecosystem status and dynamics of the whole Bering Sea, as well as Pacific salmon and major components of these ecosystems.

In 2004 TINRO-Centre will continue monitoring of the state of western Bering Sea ecosystems, as well as collection of data on Pacific salmon ecology during the period of their anadromous migrations in the high seas of the north-western Pacific Ocean. One of the goals of these studies is elucidation and interpretation of mechanisms of interaction between environmental and density-dependent factors and carrying capacity of the Bering Sea. In 2004 the studies on salmon vertical distribution, salmon food selectivity, dependence of salmon feeding on biomass and composition of plankton and nekton communities, changes of biological condition of fishes during the foraging, salmon spatial differentiation, structure of stocks contributing to the mixture and the influence of abiotic environment upon the salmon quantitative allocation and migrations are planned.

SURVEY GOALS AND OBJECTIVES

1) determination of the current state of Pacific salmon in the pelagic ecosystems of the Bering Sea and high seas of the north-western Pacific Ocean;

2) elucidation of Pacific salmon position and role in the trophic structure of the epipelagic zone of the Bering Sea and high seas of the north-western Pacific Ocean;

3) evaluation pelagic ecosystems status, as well as oceanic and overall ecological conditions in the western Bering Sea in 2004.

Achievement of these goals will be accomplished through the fulfillment of the following objectives:

1) carrying out of trawl survey of epipelagic zone in the whole areas of the Pacific waters off the Kuril Islands in the Russia EEZ and in the international waters of the North Pacific.
2) carrying out of trawl survey of epipelagic zone of the western Bering Sea and small-scale trawl survey in the Chukotka Sea.
3) Estimation of Pacific salmon and other nekton species abundance and biomass. Assessment of their biological condition and spatial distribution patterns, size and age composition of stocks and their mixtures. Sampling for feeding studies.
4) carrying out of plankton survey of epipelagic zone of North Pacific waters, Bering Sea and Chukotka Sea for collection of data on plankton communities composition and structure, salmon and mass nekton species feeding environment; description and development of nektonic communities trophic structure models
5) carrying out of hydrological survey for evaluation of climate-oceanic conditions in the areas of surveys.
6) collection of genetic samples for the subsequent laboratory analysis
7) carrying out of daily stations for the elucidation of salmon vertical distribution

LOCATIONS AND PERIOD OF SURVEY

The survey by research vessel "TINRO" is planned to begin in port of Vladivostok in June 10, 2004 (provisional date).

The first part of the survey will be devoted to the comprehensive epipelagic trawl survey of the Pacific waters off the Kuril Islands in the Russia EEZ and in the international waters of the North Pacific (Fig. 1). The second part of the cruise will be devoted to the

walleye pollock trawl survey and small-scale trawl survey in the Chukotka Sea (Fig. 2). At the final part of the survey (provisional dates – September 1 – October 15) a comprehensive epipelagic trawl survey of the western Bering Sea within the Russian economic zone (Figure 3). The research vessel returns to Vladivostok approximately in November.

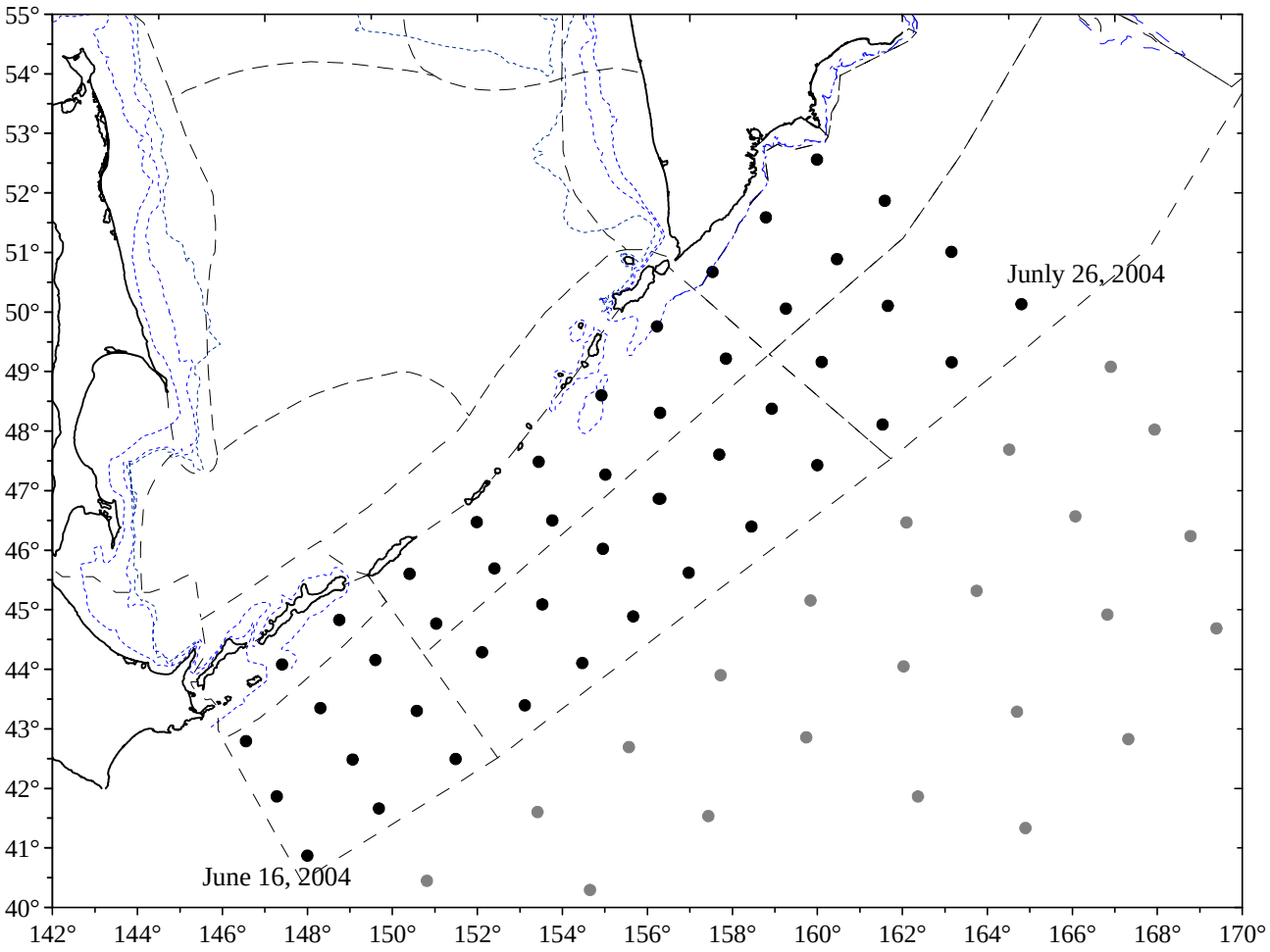

Fig. 1. Stations location for comprehensive epipelagic trawl survey of the Pacific waters off the Kuril Islands in the Russia EEZ and in the international waters of the North Pacific.

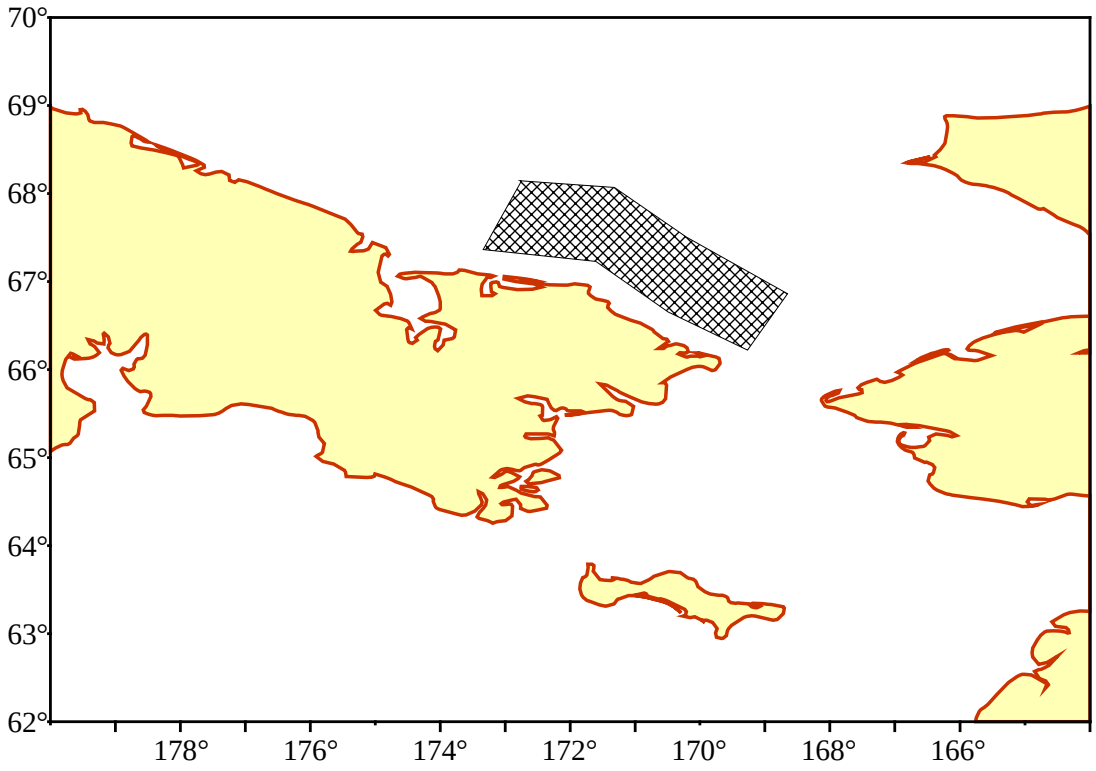

Fig. 2. Stations location for small-scale trawl survey in the Chukotka Sea.

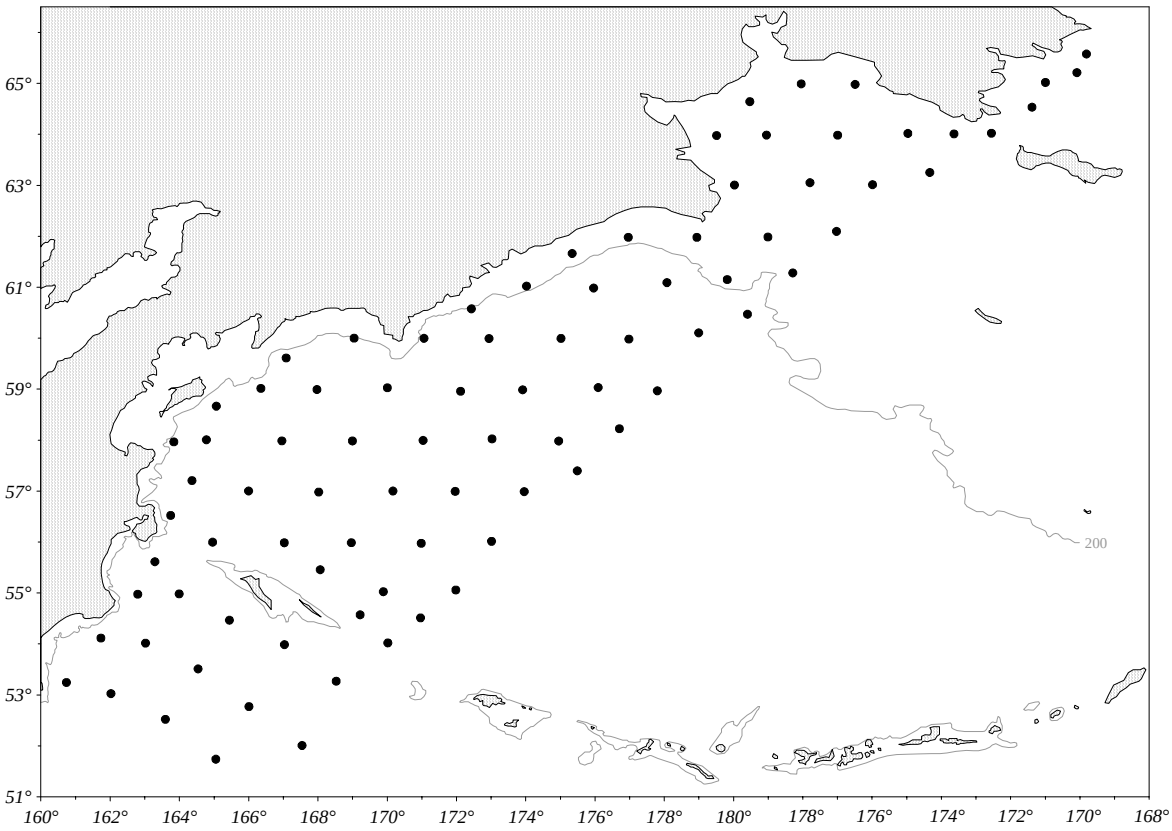

Fig. 3. Station locations to be sampled during the standard comprehensive trawl survey of the upper epipelagic layer of the western Bering Sea conducted by TINRO-Centre.